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Summary of British official reports on the metric...

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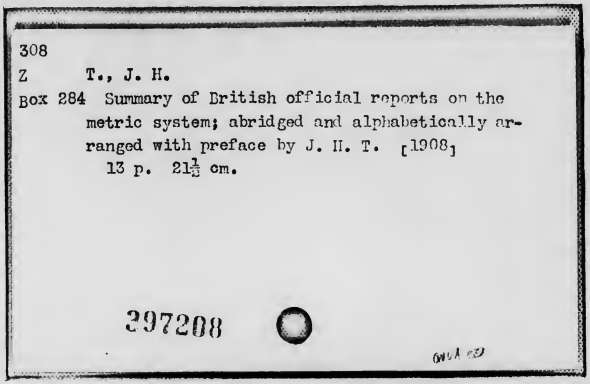

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SUMMARY OF

BRITISH OFFICIAL REPORTS

ON THE

METRIC SYSTEM.

Abridged and alphabetically arranged with Preface
by J.H.T.

H33 Aug 18 1920

PREFACE.

The present year is memorable in the history of the metric system of weights and measures, for it may now for the first time be said that every government of Continental Europe, except Great Britain, has approved of it. Among the latest adherents is Denmark, which has fixed specific dates for the change, and Russia, having some years ago established the system in Finland, is now pushing on the work actively throughout the whole Empire, the medical service of the army and navy conforming thereto from 1908. By this action of Russia and Denmark a population approaching 150 millions is affected.

Not only have governments thus accepted the change but their peoples also have adopted it, the principal exceptions being Turkey and Greece, where defective education and administration stand in the way of the progress desired by the rulers of those States.

As regard the rest of the world, roughly speaking, all Southern and Central America including Mexico, is metric. Japan has announced officially that she has a law in preparation for this reform and China has a committee discussing the general question of weights and measures. It is however very unlikely that China will adopt anything British, for her existing system is almost wholly decimal.

The United States of America are the most important of the countries which have made comparatively little progress in the reform, except that their standards of reference are metric. So are the weights and measures used by the medical services of their army, navy and public health, which were reformed a few years ago. Since Russia did the same thing in last January the empires of Great Britain and China are now the only governments in the world which have not the metric system in the medical services of their armies, navies and public hygiene. In civil life also action has been voluntarily taken by physicians in various cities of the United States, thereby establishing the metric system for medical purposes in such localities, almost to the exclusion of the old measures and it is reported that this progress is extending.

The Governments of Australia, Canada, South Africa and New Zealand have declared themselves in favour of the reform.

For the measurement of electrical quantities the metric system is exclusively used in all countries and its use for electrical machinery also in the United States and Great Britain is increasing spontaneously.

One of the most important results of the official Conference of the International Bureau of Weights and Measures at Paris in last October was an announcement that, according to the experience of Swizerland and some other countries the metric system can be used in the buying and selling of goods without seriously disturbing factories or industries. (See Récents Progrès du Système Métrique, par C. Guillaume, Paris, 1907, Gauthier Villars.) This was the intention and meaning of the English Parliamentary Bill of last year, but it was not clear to laymen, and chiefly on that account was rejected by 150 votes against 118. The Paris Conference had not been held, so Parliament had not then before it the fact that people need not be forced by law to bring the metric weights and measures into their factories, industries, or machinery, but only into buying and selling, moreover that, having thus learned the new system they will gladly extend it of their own free will to everything as in Switzerland.

In the face of all this it is greatly to be regretted that some persons still persist in attempting to frighten the public by exaggerated estimates of the cost of the change, these estimates being in every case based on the false assumption that the law, as proposed last year, was to be forced upon factories and industries, so that machinery, screws, guages and templets would have had to be altered and every gas-pipe torn up. It should be a sufficient answer to the objectors that great firms like Armstrong Whitworth, Vickers Maxim, Sir William Mather, also Lord Kelvin, welcomed the prospect of reform. Those however who need further evidence should read the published account of a conclusive trial of metric measures in the construction of 20 locomotives at the famous Baldwin Works in Philadelphia during the spring of last year. The drawings and specifications with the order came from the Paris-Orleans Railway of France and were metric throughout. Instead of changing them into English units the director, Mr. Samuel Vauclain, merely made shop-drawings in metric units and prepared metric guages and templets which, with some purchased rules graduated to millimetres, were sufficient. All measures were expressed in millimetres and nowhere was an English unit allowed to appear. Not a mistake was made. The common argument that an American workman cannot use the metric system, and that it is suitable only for scientific people was refuted on the first day; in fact millimetres were found to be simpler than feet and inches, which are liable to be misread on account of the accent-marks. The director was converted to the metric system. He had some years previously

advised the Franklin Institute that Congress should encourage that system by using it in government contracts, for which higher rates should be paid, but now he thinks that no such aid is needed. His workmen preferred the new system and took it up "without any trouble at all. With them to use it once was to understand it." As regards the cost of new gauges, templets and the like, the director said there would be no loss for these things are constantly wearing out, whereupon they are repaired by inserting new bushings which can be made to metric measure. The execution of this contract for locomotives went on while the rest of his works were using English measures, so he thinks the change could be made anywhere with little inconvenience. The important point of all this is that the metric system was forced into the Baldwin Engineering Works at short notice by an order which required execution within six months, yet no serious trouble or expense was incurred. Is it reasonable then that certain engineers and manufacturers elsewhere should oppose a law which would not force anything at all upon them, but upon commerce only, where the buying and selling of goods would have to be done by metric weights and measures? Moreover the public would have longer notice than the Baldwin company, for the law would allow at least two or three years to prepare for the change.

Discussion of the whole question would be simplified if those who make estimates of the cost of altering tools and machinery would first shew that someone proposes to force these alterations upon them. The truth is that their factories could use any weights or measures they chose under the proposed law and could turn out goods of any size or weight. In selling them also they could use any marks, counts, or numberings at their pleasure, but if weight or measure entered into a sale it would have to be metric.

Discussions of this subject are often unduly lengthened also by a mistaken idea that units of time, money, angular measure, navigation and thermometry are part of the metric system. The size of the earth is also dragged into the question because the original bar representing the metre was intended to represent a ten millionth of the distance from pole to equator. The length of that bar itself without reference to the earth is now the metre. A still commoner mistake is the assertion that the metric system does not permit common fractions.

Under ordinary circumstances this lengthy preface and the body of the pamphlet itself would have been unnecessary but there are some Englishmen who contend that the metric system has failed or made little progress in the world. Such persons can not have read the reports sent home by the diplomatists and consuls of their own country from every part of the world in 1900—1901 and presented to Parliament. (Cd, 253 and 435, Commercial.) This pamphlet is a summary thereof under the name of each country in alphabetical order. Some notes have been added from "Récents Progrès," the official paper presented, as above stated, to the Paris International Congress. These notes are marked "R.P." while the Consular and Diplomatic abstracts are marked "D.R." The whole subject of weights and measures especially the metric system has been admirably treated by Hallock & Wade in "The Evolution of Weights and Measures and the Metric System" (MacMillan, London and New York, 1906, 10/-). J.H.T.

September, 1908.

Argentine Republic.

1.—The metric system was introduced with "but little difficulty between 1863 and 1887 when it became obligatory." There can be no doubt as to the satisfactory practical operation of the change, and there is no desire whatever for a return to the old system. Importers of British cotton or woollen goods sell them mostly in metres, not in yards. The names of the old measures are often used through habit; not in opposition to the new system.—D.R.

Austria.

2.—Difficulties exceptionally great were encountered through discrepancy of the old and new systems in Austria. Some temporary use of units approximating to old ones was allowed during the four years of transition commencing from 1872, but old names were disallowed. After those four years of grace the new system was a "recognized institution." That period was quite "sufficient" and the reform has given "complete satisfaction" without the "smallest desire" of reverting to the old methods."—D.R.

Belgium.

3—The metric system was first adopted in 1816 and from 1817 it was by law taught in schools. Its use was obligatory from 1820, the name "aune" being given to the metre and "livre" to the kilogramme, but the system was not generally used till the passing of the law of 1855, either by reason of lax administration or unpopularity. A shorter period would have probably sufficed with better administration. "At all events it may be safely stated" that at present a return to the old system would provoke more resistance than did the establishment of the reform. Trade is conducted with less difficulty, and honesty is better secured.—D.R.

Brazil.

4—The metric system was adopted more than twenty years ago with "perfect ease" and there is no desire for reversion to the old system. British exporters are ready to deal in metric terms. Sometimes the old units are employed for the salt trade and piece goods and Brazilian engineers and contractors are familiar with the British units.—D.R.

Bulgaria.

5—The metric system was introduced in 1888 by law making it compulsory after six months for grain-measures and after three years for other uses. Previously the Government had for long used it officially. The peasants still reckon produce on the old system, but the market dealers buy from them on the metric scale. Conversely the peasant asks in the town for goods on the old scale and is supplied with them metrically. The peasants still keep the old weights for private use, but no sale of grain is permitted in the villages except in metric terms. The change is not yet complete but there is no apparent desire to return to the old system, certainly not among the commercial classes. Several cases have been noticed where merchants have been deterred from dealing with England through not understanding English catalogues.

Central America.

6—In Guatemala, El Salvador, Costa Rica and Nicaragua, both the old Spanish and the metric systems are used, but the people are ignorant and opposed to change and the reform has made little progress. The Government certainly will not revert to the old system.

Chile.

7—The system "has always been attended with great success."—D.R.

China.

8—The metric system is not in force as there is no movement in favour of its adoption.—D.R.

A Committee is now sitting in China with Imperial Orders to consider the whole question of weights and measures. (J.H.T. 1908.)

Colombia.

9—The metric system since 1853 has been compulsory for official purposes but is permissive otherwise. The change "presented no difficulties and is becoming more generalized every day and no desire or thought exists of returning to the old standard."—D.R.

Corea.

10—Apparently the Chinese system is in use. In selling coal the English ton is used.—D.R.

Denmark.

11—The great bulk of commercial, professional, and shop-keeping people favour the proposal made in 1899 for use of the metric system, but the peasants whose representatives in the Lower House of Parliament are dominant oppose the reform—D.R.

In May, 1907, a law has been passed making the metric system compulsory after two years' notice, the dates to be fixed by the King. The measures of land are temporarily exempted. —R.P. (Those dates have now been fixed.—J.H.T. 1908.)

Egypt.

12—The metric system was applied to all Government uses in 1892, excepting land and the tonnage of ships. Most of the wholesale and retail trade employs the old Egyptian weights and measures. The change has been beneficial and the system is taught in the government schools. "Since that time the metric system has come into general use in all government departments."—D.R.

France.

13—The progress of reform may be classified by three periods, the first 1790—1812, the second 1812—1837, and the third 1837—1840. The system approved in 1790, was in August, 1793, ordered to be used exclusively from 1st July, 1794. The law was not strictly applied and there was permission to use old names for the new quantities, "an expedient which later experience strongly condemns." From these causes no very satisfactory results were attained. The decree of 1812 commences the second period 1812—1837 and

was retrograde, containing further concessions to old prejudices. It made the new system universal for the uses of Government. Models were made of the new weights and measures, but alongside of the metric names other names, based on the old ones and called "mesures usuelles," approximating in size to the metric quantities, were inscribed thereon. This toleration of old names retarded reform and the weights and measures of the market place differed from those of wholesale dealings. Obviously the failure of the 1812 decree was due to the disbelief of the Government in the possibility of success. The third period commenced with the law of 1837 making the metric system universal and compulsory after a period of $2\frac{1}{2}$ years. The new system alone was to be taught in schools with the stimulus of rewards for teachers and models had to be exhibited in every commune. "The change encountered practically no opposition, not even "among the peasantry where it might have been expected, nor "does the adoption of the decimal subdivisions seem to have "been a source of difficulty." The previous partial system must to some extent have prepared the way for the final transition. —D.R.

German Empire.

14—The Regulation of 17th August, 1868, gave about $3\frac{1}{2}$ years' preparation for introduction of the metric system with permission for its use from January 1st, 1870. It has "taken complete root in German commercial life, and its utility has been fully demonstrated," though the public to a large extent still follow the old system, especially in relation to length and surface. There is no serious desire for a return to the old systems which were not only diverse, but unconnected with decimal reckoning, the advantages of which are so manifest.—D.R.

Greece.

15—The metric system was legally established in Greece by a decree of 1836, but has been acted upon to a very limited extent. It is used by the Government for measuring distance and area, but the public employ for all purposes the old weights and measures. The law has been merely permissive and compulsion has never been decreed though the question has been considered.—D.R.

Hungary.

16—The Ministry of Commerce at Budapest reports that the metric system became obligatory in 1876, having been permitted six months earlier. During that period explanatory

tables, procurable at a nominal cost, had to be conspiciously exhibited by merchants and official scales were displayed. Educational authorities and municipalities were required to aid the reform. It became quickly naturalized, though long after 1876 the old system was found in use. Such instances are now very rare and must soon disappear. No one has been heard to express a desire for returning to the old system.—D.R.

Italy.

17—Napoleon I. after his conquests made the metric system compulsory. After his fall the various old systems were revived but in 1840 the northern States commenced a metric reform adopting it, one after the other, till in 1874 arrangements were completed for the Italian Kingdom. The change has been gradual, and, at all events in the Neapolitan Provinces, is still incomplete after 40 years. Horses are still bought and sold by measurement according to 'palms.' In the district of Naples and Sicily old measures of land are used; in fact the change has been difficult and in parts of the country is far from complete. Its "undoubted simplicity has made it popular." There is no desire to return to any old system and the new one progressing may be expected in due course to be universal. It has been effected in Lombardy with comparative ease.—D.R.

Japan.

18—Japan has legalized the metric system in 1893, but it is not compulsory and has not come into general use.—D.R. 1901.

Japan is progressing towards complete metric reform, having first made the native units commensurate with the metric ones. The metric system is taught in the primary schools and already is almost exclusively used in medicine and by the army. The introduction of English and American machinery brings in the British system. A law is in preparation for the definite adoption of the metric system.—R.P. 1907.

Luxemburg.

19—The metric system, introduced into the Duchy of Luxemburg in 1816, has always been considered a progressive step, and its convenience and utility have never been questioned. The chief difficulty in adopting and popularizing it were the old names given to the units. There has never been any intention of abandoning it.—D.R.

Mexico.

20—The metric system has been permitted since 1862 after six years of preparation by use in the public offices, &c. In 1895 it became obligatory, the delay being partly due to the unsettled state of public affairs and the ignorance of the Indians. The Mexican yard and pound are still a good deal favoured by them, but it is "pretty certain that in a few years the last remnants of the old system will have disappeared." Fifteen months' notice of compulsion was given before its application. The Government and public in general consider the change to be an "unqualified success."—D.R.

Montenegro.

21—The metric system was adopted in 1888 and enforced with little difficulty. The oka is still used by the people, not by Government, for measuring grain and tobacco, but with this exception, all commerce is in metric terms.—D.R.

Morocco.

22—Has not adopted the Metric System.

Netherlands.

23—The metric system was introduced in 1816, the old names of units however were retained. In 1869 the old law was repealed and a new one allowed the metric names side by side with the old ones. At the present time the metric weights and measures have completely displaced the others, but the old names have not entirely disappeared, though the corresponding measures are metric.—D.R.

Norway.

24—In 1879 the metric system was made optional for private purposes and compulsory in government. After three years in 1882 it was made compulsory and universal. In medicine the gram had been adopted in 1871 as also by the post office. During the three years of change old weights and measures were altered by Government so as to agree with convenient metric equivalents. This was done gratis for two years and on payment for the last year but afterwards this expedient was forbidden. The change has been hailed by merchants "with much satisfaction" and has been learned by the lower classes without difficulty, being found expeditious and suited to all practical requirements. Foreigners using this system will preferably deal with those who do the same.—D.R.

Persia.

25—Persia has not adopted the metric system.—D.R.

Peru and Ecuador.

26—The metric system was decreed in 1862 and is in theory the system of both countries. All departments of government use it and it is obligatory for consular invoices. It is universally taught in schools. Nevertheless in the markets and ordinary commerce the old Spanish system is ordinarily used.—D.R.

Portugal.

27—The metric system required for its introduction some 10 or 12 years from 1852 and is now "entirely satisfactory" to the commercial and industrial classes who shew no desire to return to the old system. As regards the names of units the peasantry use and retain some old terms. This progress is the more satisfactory in view of the fact that 75 per cent. of the people are illiterate. The reform was commenced in 1852 by a law laying down its successive stages, to be completed in 10 years if necessary by districts. The Ministry of Public Works first used it in 1853. In 1857 it became compulsory for all schools and in 1859 for legal documents. Lisbon sold for a limited time at cost price specimens of the new measures and weights. In 1861 the administrations of the Army and the Interior adopted the system. By 1870 it became illegal to use or possess the old weights or measures, but the time was extended till 1872 for country districts. It is said that a telegraphic order for goods, written in metric terms, will always take precedence of one in English units, and that school children have saved "many months" of time through the simplicity of the new system and can take up new studies.—D.R.

Roumania.

28—The metric system, promulgated in 1864, became obligatory from the end of 1884. From 1885 urban and rural communes had established offices for verifying the new weights and measures. Traders gained rather than lost by the change, as the price of the former weights and measures applied to the smaller new ones yielded a profit. There is no desire for a return to the old system, even the old names are almost extinct.—D.R.

Russia.

29—Metric reform was first discussed in 1874. It has been made universal and compulsory in Finland without meeting

difficulties from any class of the population. This was facilitated by the high educational level of Finland and preliminary instruction in the subject through the schools and press. Two years' notice of the change was given. Tentative measures are in force in Russia proper.—D.R.

In 1907 the Minister of War directed the exclusive use of the metric system to commerce in the Medical Service of his department from the beginning of 1908. In civil medicine almost all prescriptions are metric. The reform has made great progress in iron work through the adoption of standards prepared under the advice of a public commission. There is no opposition to the change which is spreading rapidly throughout the Empire under the authority of M. Egoroff, President of the Central Chamber of Weights and Measures.—R.P.

Servia.

30—Ten years were required from 1873 for the reform which "has proved satisfactory" and no desire for a return to the old system is shewn.—D.R.

Siam.

31—There is no authoritative system, but the railway and public works' departments use the metric system, which was introduced in 1889 without inconvenience, and works satisfactorily, so that there is no desire to abandon it: in fact the British civil engineers of the public works after a few months trial "invariably declared its superiority over any other system." Outside these public departments the Siamese use the native system.—D.R.

Spain.

32—The metric system was made obligatory in 1849 and the date of its operation fixed at 1853. This was from time to time postponed till 1869, not on account of systematic opposition but passive resistance, chiefly through popular ignorance of equivalent values. At present the system may be considered as in force, but not completely so, except in provincial capitals and large towns. In the smaller towns, except as regards weight, the old system prevails. The minimum quantity of apparatus to be held by each manufacturer or trader is fixed. There is no desire to go back to the old system.—D.R.

Sweden.

33—In 1878 the metric system was introduced with effect from 1879. The old system however was permitted for ten years. The change met with no difficulty and "has shewn itself in every way satisfactory in practice." It has had a very good effect on native commerce.—D.R.

Switzerland.

34—The metric system, having been made obligatory in 1875, with effect from 1st January, 1877, came into use in the towns with no great difficulty. The change was not so easy in the country, but official aid and inspection advanced the reform and now the Federal Government "confidently affirm" that the metric system has in every respect proved satisfactory.—D.R.

The laws of some countries, for example Switzerland, imposed no restrictions on the weights and measures used in manufactures, but for commerce prescribed the metric system in the belief that its merits would ensure its voluntary adoption. This hope has been realized. The watchmaking industry was the slowest in accepting reform, but is now practically metric throughout the whole country.—R.P.

Turkey.

35—A law of 1886 made the metric system compulsory in Constantinople after 5 years and in 1891 the old measures were destroyed there with some difficulty, but nothing was done in the provinces. The new measures were less than the old and so the purchasers lost by paying the old prices. The reform was then allowed to lapse but the metric system is still largely used, where, as in the case of fuel, the new and old measures happen to coincide. In title deeds the two systems are used together. The new system was again attempted in Constantinople in 1897 but abandoned in face of opposition.—D.R.

United States of America.

36—British weights and measures are used generally throughout the United States and include the Winchester bushel and the wine gallon. In 1866 the metric system was made lawful, but not compulsory. In 1875 the United States with 16 other governments joined the International Metric Convention, at Paris, where the nations by joint contributions maintain a bureau for the preservation and reproduction of metric standards, copies of which were received in 1890 by the President in the presence of a distinguished assembly. The use of the system in the

United States has generally been confined to the geodetic sur[vey] educational institutions and laboratories. It is the basis of [the] electrical measurements. Its use in the public and other schools has made a large portion of the population familiar with it and their demands have resulted in several bills laid before Congress, none of which however have passed, but the recent acquisition of territory in which it is used must soon force the question upon manufacturers. They raise objections but would no doubt prefer the metric system, were it not for the cost of changing their tools and machines.—D.R.

The United States maintain the metric system in their new possessions, the Philippine Islands, Porto Rico, and Guam. In 1894 that system was also made obligatory in the Medical Service of the Army and Navy of the United States and afterwards in that of Public Health. Many other Acts of the Government shew that its object is to accustom, first its officers, then the public, to the new weights and measures before enforcing them in commerce. This plan has been successful and there are now cities where by public choice the metric system is used in medical prescriptions almost to the exclusion of the old measures.—R.P.

Uruguay.

37—The metric system was made permissive in 1862, but the law had no effect. In 1894 the system was made compulsory. The old names are still in use especially for land measurement. As regards retail trade the public is accustoming itself to the new system. Builders and carpenters use only the metre. If there be any desire to return to the old system "it is only on the part of ill-informed persons to whose opinion no importance need be attached."—D.R.

Venezuela.

38—The metric system has been officially established since 1857, but in private practice things are unchanged. The old Spanish units are in general use, but small quantities are reckoned on the British system by pounds and ounces, American scales being common.—D.R.

Zanzibar and German East Africa.

39—The old native measures are in use but their size is officially regulated by reference to the metre.—D.R.

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